period than to correlate both the Potomac and the time-break with the Jurassic and assume that the lower Cretaceous horizons of Europe lack representation in our Atlantic series.

In drawing attention to these matters of apparent difficulty I have no intention to controvert Prof. Marsh's view, but merely to show how desirable it is that he set forth the reasons therefor. G. K. GILBERT.

WASHINGTON, D. C., December 5, 1896.

LE CONTE'S ELEMENTS OF GEOLOGY.

TO THE EDITOR OF SCIENCE: In commenting on Le Conte's 'Geology' (SCIENCE, November 27th), Prof. C. W. Hall objects to 'the multiplicity of theories advanced and discussed.' He says: "A text-book should be the exponent of a doctrine. It should be constructed on the definite and positive plan best adapted, in the mind of the author, to expound his body of principles. When several theories are presented and the student practically told to take his choice, or when he is told that all are true, the function of the text-book disappears." The student who leans upon a text-book based only on facts and well understood phenomena 'subjects himself to the inspiration of positive ideas, and, in his intellectual processes, acquires that habit of decision so essential to practical success.'

It is with diffidence that I venture to dissent from Prof. Hall's opinion, because he is an experienced educator and I am not; but it appears to me that something is to be said in favor of occasionally submitting to students alternative opinions regarding an unsettled question. The scientific text-book which presents only facts and accepted principles, or gives only the author's opinion on open questions, must tend to leave the student with the impression that scientific knowledge is complete. The statement and discussion of rival hypotheses not only exhibits the actual incompleteness of knowledge, but illustrates the method of progress, and it appears to me quite as important to the world's future that the rising generation shall learn the method of research as that it become acquainted with the results of research. It may also be questioned whether the habit of decision inspired by the exclusive assimilation of positive ideas will usually lead to the best results when applied to the practical affairs of life. Problems of affairs resemble, in the complexity of their factors, the problems of such a science as geology; and the mind which habitually suspends judgment until various points of view have been considered may gain, through the wisdom of its decisions, as much as it loses through delay. G. K. GILBERT.

WASHINGTON, November 30th.

THE POSITION OF THE COMPANION OF SIRIUS.

TO THE EDITOR OF SCIENCE: A brief statement regarding the correspondence of the position of the companion of Sirius as observed with the 36-inch refractor of this observatory with the positions obtained from the published elements may be of interest to the readers of SCIENCE.

So far as I know, four sets of elements have been published, which are based upon all the micrometric measures previous to periastron, namely, those by Auwers, Burnham, Howard and Zwiers. Mr. Burnham gives no ephemeris with his orbit (period, 51.97 yrs.), but from the elements it is safe to say that his ephemeris would not differ very widely from that computed by Zwiers. An approximate interpolation in the ephemerides by the other computers gives the following position for 1896.8:

	P.	s.	Period.
Howard (A. J. 235)	214.°6	4.″75	(57.02 yrs.)
Auwers (A. N. 3085)	175. 7	3. 92	(49.40 ")
Zwiers (A. N. 3336)	186. 4	4. 05	(51.10 ")
The simple mean is	192.°2	4.″24	

The mean of five measures of position angle and four of distance by Prof. Schaeberle and myself gives for the same date, 189.°3, 3.″67 (A. J. 388). This communication is suggested by the note on the same subject by 'H. J.' in the November 20, 1896, number of SCIENCE.

R. G. AITKEN.

MT. HAMILTON, November 30, 1896.

COMPLIMENT OR PLAGIARISM.

MY courteous friend, Prof. Fiske, hastens to acknowledge that the quotation from Halsted's Elementary Synthetic Geometry in SCIENCE, p. 656, shows that "the criticism is not applicable to his more recent work."

Yet he asserts that in no American text-book 'has a thoroughly satisfactory treatment been given,' and says: "In my opinion, it is not possible to discuss, in an elementary manner, propositions relating to the magnitude of curved lines until after the introduction of Duhamel's well-known postulate. It may therefore be of psychologic as well as geometric interest to point out that I had lived through the mental state in which my honored friend, Prof. Fiske, now finds himself, and had already attained simpler and clearer light before 1893, when there appears in my paper 'The Old and the New Geometry' in the *Educational Review* the following:

"'That stale stupidity, 'A straight line is the shortest distance between two points,' is equally unavailable for foundation building.

"As Helmholtz says: 'The foundation of all proof, by Euclid's method, consists in establishing the congruence of lines, angles, plane figures, solids, etc.

"'To make the congruence evident the geometrical figures are supposed to be applied to one another, of course without changing their form and dimensions.'

"But since no part of a curve can be congruent to any piece of a straight line, so, for example, no part of a circle can be equivalent to any sect in accordance with the definition of equivalent magnitudes as those which can be cut into pieces congruent in pairs. Thus the whole of Euclid's *Elements* fails utterly to prove any relation as regards size between a sect and an arc joining the same two points. We cannot even affirm that any ratio exists between a circle and its diameter until after we have made extra-Euclidean and post-Euclidean assumptions at least equivalent to the following: 1. No arc is less than its chord. 2. No minor arc is greater than the sum of the tangents at its extremities."

May I be allowed to state that in the years that have followed my printing of this double postulate I have only been more confirmed in my opinion that it is more elementary and more elegant than the one for which I deliberately substituted it, and which Prof. Fiske has again given on p. 724 of Science. When Prof. Fiske applies these ideas to the geometry of Beman and Smith, I am very forcibly reminded that without the slightest word of acknowledgment these professors '*took*' a whole block of problems and a long note from Halsted's Elements of Geometry.

The section *Partition of a Perigon*, Elements p. 151, is so peculiarly my own that it was as startling as a ghost to meet it unexpectedly in Beman and Smith p. 179. Then follows my Problem I: To bisect a perigon, with my corollary; then follows as their Problem 2 my Problem II: To trisect a perigon, with my corollary. Then my Problem III: To cut a perigon into five equal parts, and my corollary. Then my Problem IV: To cut a perigon into fifteen equal parts, with my corollary. Then before they go on to my Problem V. and Problem VI. and Problem VII. and Problem VIII., they insert my long note, Elements p. 155; but here they out-Herod Herod, or rather out-Perigon Halsted, for where I say that Gauss, in 1796, found that a regular polygon of 17 sides was inscriptible, they make it say 'In 1796 Gauss found that a perigon could be divided into 17, etc.' But, of course, the whole of the *matter* here involved is so well known that I accept the implied compliment, *broad* as it is, and dream that even my rather cranky problem to bisect a perigon was not really as peculiar as I had thought it.

George Bruce Halsted.

Austin, Texas.

The Date of Publication Again.

Dr. J. A. Allen has not offered any serious objections, to my view of this matter in his remarks in Science of December 4th, as it seems to me, but he has in one instance misunderstood me, as I now explain. He quotes as follows my remark, that "although some reports issued by our government may bear dates much prior to the dates of issue, it does not follow that the date of printing bears any such relation to the date of issue." What I meant by this may be illustrated by a concrete case. The 'Report of the Commissioner of Education,' which I last received, bears on its back and title page the dates 1893–4. As it was not printed until 1896, I find the date 1896 at the foot of the title page. This will explain my meaning, which would seem to have been misunderstood by Dr. Allen. It also explains my remark